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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/197,499	11/23/98	SHIMAZU K	03/60-52794.

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BIRCH STEWART KOLASCH & BIRCH
P O BOX 747
FALLS CHURCH VA 22040-0747

EXAMINER	
NGUYEN, N	
ART UNIT	PAPER NUMBER
1754	18

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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.	Applicant(s)	
09/197,499	SHIMAZU et al	
Examiner	**Group Art Unit**	
N. M. NGUYEN	1754	

—The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address—

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE three (3) MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Status

☒ Responsive to communication(s) filed on April 7, 2000.

☒ This action is **FINAL.**

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 1 1; 453 O.G. 213.

Disposition of Claims

☒ Claim(s) 1, 5-21 is/are pending in the application.

Of the above claim(s) 10-17 is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 1, 5-10, 18-21 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claim(s) _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 11 9(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 1 7.2(a)).

*Certified copies not received: _____.

Attachment(s)

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 8 (filed 11/23/98) ☐ Interview Summary, PTO-413

☒ Notice of Reference(s) Cited, PTO-892 ☐ Notice of Informal Patent Application, PTO-152

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948 ☐ Other _____

Office Action Summary

DETAILED ACTION

Claims 9-10, 20-21 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Applicants are requested to point support in the instant specification, by page and line numbers, for "a powder Raney catalyst for a fixed bed" as required in the instant claims 9-10. It should be noted that the lump Raney catalyst for a fixed bed is used for a hydrogenation process, and after such used, the lump Raney catalyst can be reactivated by crushing into powder (note page 6, second full paragraph). However, it appears that the instant specification does not disclose that such powder Raney catalyst can be used for fixed bed.

Claims 1, 5-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, when step (iii) is positively required, it is unclear if "said quenched lump alloy" in step (iv) is referred back to the quench lump alloy in step (ii) or the alloy obtained after the breaking step. It should be noted that if step (iii) is required, the lump alloy would be broken into particles and no quench lump alloy remains for step (iv).

In claim 5, in the last step, the limitation of "activating said quenched lump alloy or said quenched lump alloy particles to form a Raney catalyst" is required, however, it is unclear if the previous steps, i.e. the "breaking" and "classifying" steps are positively required, because if they are, the "quenched lump alloy" would become quenched lump alloy particles and there would be no more "quenched lump alloy" to be activated in the last step.

In claims 6-8, 20-21, there is no antecedent basis for "the lump Raney catalyst".

Claims 7-8 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. In the independent claim 5, it is required that the fixed bed catalyst "consisting of a nickel aluminum alloy with molybdenum and/or tin up to 15%", however, in claim 5, it is required that the mixture which is used to make the catalyst "consists essentially of aluminum and nickel". The "consisting essentially of" in claim 5 fails to further limit the "consisting of" language in claim 1.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who

has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 5, 7 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Schuetz et al (5,536,694).

Schuetz '694 discloses a fixed-bed catalyst consists of powder particles of the catalyst alloy which are bonded by sintering with a powder (i.e. the binder) of the Raney process metal itself. It contains no catalytically inactive binder at all (note column 5, lines 21-25). Ni and Al were used (note Table 2, Example 1). The limitation of "with molybdenum and/or tin up to 15%" includes the value of zero.

The product as disclosed in Schuetz '694 anticipates the claimed product.

Alternatively, any difference imparted by the product by process limitations would have been obvious to one having ordinary skill in the art at the time the invention was made because where the examiner has found a substantially similar product as in the applied prior art the burden of proof is shifted to the applicant to establish that their product is patentably distinct not the

examiner to show that the same process of making, see In re Brown, 173 U.S.P.Q 685, and In re Fessmann, 180 U.S.P.Q. 324.

Claims 5, 7-8, 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schuetz '694.

Schuetz '694 discloses a fixed bed catalyst as stated above. The ratio by weight of Raney process metal to leachable alloying component in the catalyst alloy is in the range from 30:70 to 70:30 as is usual with Raney alloys (note column 3, lines 59-63). This range overlaps the claimed range. The ratios by weight of catalyst alloy powder to binder in the range 100:20 to 100:0.5 have proven to be useful (note column 5, lines 51-52). The catalytically active metal is selected from the group consisting of nickel, cobalt, copper, iron and mixture thereof (note claim 3), the leachable alloy component is selected from the group consisting of aluminum, zinc, silicon and mixture thereof (note claim 4). Specifically, Ni and Al is used in Example 1 (note Table 2)

The subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to have selected the overlapping portion of the range disclosed by the reference because overlapping ranges have been held to be a prima facie case of obviousness, see In re Malagari, 182 U.S.P.Q. 549.

Schuetz '694 further disclose discloses that the catalysts may be doped with other metals in order to influence their catalytic properties. Doping and promoting Raney catalysts are known in the art and suitable promoters are chromium, iron, cobalt, molybdenum, etc. They are

expediently added as alloy components in the catalyst alloy. Their proportion in the catalyst alloy is typically up to 15 wt% (note paragraph bridging cols 5-6). It would have been obvious to the skilled artisan to dedermine the type, the amount of the metal dopant by routine experimentation.

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to add Mo and/or Sn to the catalyst of Schuetz '694 because it is known in the art that doping metals can influence their catalytic properties.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schuetz '694 in as applied to claims 5, 7-8, 19 above, and further in view of Lepper et al (4,520,211).

Schuetz '694 discloses a fixed bed catalyst with the size of 5.2 x 3 mm (note last two lines of column 7). The disclosure of Schuetz '694, however, should not be limited to just the exemplified size. It would have been obvious to one of ordinary skill in the art to optimize the size of the shaped, activated catalyst of Schuetz '694 in order to obtain the best results.

Lepper '211 teaches that in a process of making polyhydric alcohols (i.e. sugar alcohols) by the hydrogenation of carbohydrates, a "catalyst solid bed" is preferred. The catalyst solid bed is defined as stationary arrangement of the catalyst in the reactor in the manner of a packed bed (note column 2, lines 47-52), thus the catalyst solid bed in Lepper is considered the same as a fixed bed catalyst. Lepper further discloses that the particle size of the catalyst employed in lumpy form may vary widely. On the one hand, the catalyst particles should not be so small that the flow resistance of the catalyst solid bed greatly hinders the through flow of the mixture of

hand, the maximum dimensions of the lumpy catalyst are given by the reactor geometry. As a rule, the particle size of the catalyst lumps, i.e. the diameter and/or length of the catalyst particles, will be selected so that it is in the range of from about 2 to 10 mm (note column 3, lines 16-32). This range overlaps the claimed range. The subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to have selected the overlapping portion of the range disclosed by the reference because overlapping ranges have been held to be a prima facie case of obviousness, see In re Malagari, 182 U.S.P.Q. 549. It is noted that the in Lepper '211, the catalyst is a ruthenium-containing catalyst, not a Raney catalyst, however, only the physical size of the catalyst (not the composition of the catalyst) has direct impact on the flow resistance, etc., as discussed above, for the hydrogenation process.

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to optimize the particle size of the shaped, activated catalyst of Schuetz '694 within the range suggested by Lepper '211 because such range is desired for a fixed bed catalyst in the hydrogenation process.

Claims 1, 5, 7-10, 18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schuetz et al (5,536,694) in view of Raney (1,628,190) and optionally further in view of Richter (3,673,116).

Schuetz '694 discloses that activated metal catalysts are known as Raney catalysts in the chemical engineering field, they are used mainly in the powdered form in a large number of

reactions for hydrogenating organic compounds. These powdered catalysts are prepared from an alloy of a catalytically active metal and another alloying component which is leachable in alkali. The catalytically active metals used are mainly Ni, Co, Cu or Fe. The alloying component which is mainly used is aluminum (note column 1, lines 30-41). Schuetz '694 further teaches that powder catalysts have the disadvantages that they can only be used in batch processes and have to be isolated after the catalytic reaction by time-consuming filtration of the reaction media. Various processes for preparing molded items have therefore been disclosed which lead to activated metal fixed bed catalysts after extraction of the aluminum. Thus, for example, coarse particulate, i.e. only coarsely milled, Raney alloys are available which can be activated by treatment with caustic soda solution (note column 1, lines 51-60). When coarse particulate is desired to be used in fixed bed catalyst, it would have been obvious to one of ordinary skill to remove any particles with undesirable size before activating the Raney alloy.

The difference is Schuetz '694 does not specifically disclose the process of making the Raney alloys even though Schuetz '694 does disclose that such alloys are known in the art.

Raney '190 discloses a method of producing metallic nickel in a catalytic state such as may be used in the hydrogenation of oils, fats, waxes and the like (note page 1, lines 5-7). The process comprises the steps of alloying metallic nickel with metals such as silicon and aluminum in various proportions, and then dissolving the aluminum and silicon from the alloy by means of a solvent which will not attack the nickel, whereupon the nickel remains in a finely divided state (note page 1, lines 8-13). The alloying is carried out by melting the nickel, aluminum and silicon either

separately, or together, cooling the melt and pulverizing the solidified alloy. Raney '190 further discloses that the nickel aluminum alloy may be either very finely pulverized or it may be broken in pieces the size of peas or smaller. In either condition, the alloy may be treated with caustic soda or the aluminum removed with the use of some other solvent. In case the larger pieces are used, the nickel is left in a more or less spongy and porous state, somewhat similar to a cinder, and for certain classes of work is necessary and desirable to have the catalyzer in this condition (note page 1, lines 81-92).

Optionally, Richter '116 can be applied to teach in the well known process of making Raney catalyst, "cooling" is quenching, or at least cooling is preferred to be quenching, note in Example 1, "cooled" is used and in Example 2, "quenching" is used. Also, Richter discloses that it was found beneficial to cool rapidly the Raney alloy produced by melting by excluding air, since the fine crystalline texture of the Raney alloy which occurs during the quenching of the melt, is easy to homogenize (note column 2, lines 39-43).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the known Raney process such as the process disclosed in Raney '190 which comprises the steps of melting , cooling or quenching, pulverizing, to produce the Raney alloy in the process of Schuetz '694 and to only coarsely pulverize the alloy in order to use coarse particles in a fixed bed as disclosed in Schuetz '694.

It also would have been obvious to one of ordinary skill in the art at the time of the invention was made to further pulverize the coarse particles to obtain finer particles when powder

catalyst is desired. It should be noted that in Schuetz '694, both powder catalyst or coarse catalyst can be used.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schuetz '694 in view of Raney '190, optionally in view of Richter '116 as applied to claims 1, 5, 7-10, 18-21 above, and further in view of Lepper et al (4,520,211).

The difference is Schuetz does not disclose the size of the coarse catalyst used for the fixed bed.

Lepper '211 is applied as stated in the above rejection to teach the desired particle size for a fixed bed catalyst used in a hydrogenation process.

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to coarsely milled the Raney alloy as disclosed in Schuetz '694 within the range suggested by Lepper '211 because such range is desired for a fixed bed catalyst in the hydrogenation process.

Claims 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Diffenbach et al (3,719,732) in view of Lepper '211.

Diffenbach '732 discloses a process for producing active catalyst particles comprising:

providing a melt consisting essentially of an alloy selected from the group consisting of Al-Ni, Al-Co, Al-Fe and Al-Cu;

forming said melt into discrete droplets;

simultaneously shaping and cooling said droplets by dropping said droplets into a vaporizable liquid (i.e. quenching);

leaching at least a part of said aluminum content from said shaped particles so that the shaped active catalyst contains at least 10% of the non-aluminum component (note claim 1).

The Ni-Al composition varies from 40-60 Ni-Al to 10-90 Ni-Al (note Table in column 6). This range overlaps the claimed range, see In re Malagari as stated above. The particles having a diameter of from about 1/4 to ½ inch (= 6.35-12.7 mm) (note column 5, lines 69-70). The range of "up to 15%" for the Mo and/or Sn would include zero.

The difference is Diffenbach '732 does not disclose the step of pulverizing the shaped particles before the leaching step.

Lepper '211 is applied as stated above to teach that the desired particle size for a fixed bed catalyst is between 2-10 mm.

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to grind the particles produced in the process of Diffenbach '732 to obtain a slightly smaller (i.e. coarsely grind) particle size as suggested by Lepper '211 because the smaller size is more desired for the fixed bed catalyst.

Claims 1, 5-10, 18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over .

over Diffenbach '732 in view of Lepper '211 and further in view of Schuetz '694.

Diffenbach '732 and Lepper '211 are applied as stated above.

The difference not yet discussed is Diffenbach '732 does not disclose the second pulverizing step and the presence of Mo and/or Sn.

Schuetz '694 is applied as stated above to teach that both fixed bed catalyst, i.e. coarse catalyst and powder catalyst, i.e. finer catalyst are desired in the art and the addition of doping metals to the catalyst is desired in the art.

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to further pulverizing the Raney catalyst of Diffenbach '732 when the powder catalyst is desired as suggested by Schuetz '694.

Applicant's arguments filed April 7, 2000 have been fully considered but they are not persuasive.

Applicants argue that on pages 6-7 of the instant specification, it is disclosed that on pages 6-7 that the lump form Raney catalyst may be collected, crushed into powder and then reactivated to be reused and the preceding paragraphs characterize the "use" of the catalyst in the fixed bed form.

The argument is not persuasive because even though the powder can be reused as disclosed in Applicants' specification, however, there is no indication that the powder form can be

in a fixed bed. It should be noted that in Example 1, under "Catalyst reuse", the powder form catalyst is used in a "stirring type autoclave" not in a fixed bed.

Applicants argue that after the "breaking" step, the Raney catalyst would still be in the lump form.

It should be noted that in Applicants' claim 5, after the "breaking" step, quenched lump alloy is converted into "particles". Even if the "particles" can be considered as in "lump form", it is still unclear if "said quenched lump alloy" as required the activating step of Applicants' claim 5 refers to the "quenched lump alloy" of the quenching step or the "particles" of the breaking step.

Applicants argue that Schuetz fails to teach or suggest a catalyst consisting of a nickel aluminum alloy with molybdenum and/or tin up to 15% because Schuetz requires the use of a binder such as powder nickel, cobalt, etc.

In Schuetz, the binder can be Ni, which would not be excluded by the "consisting language". For the additive such as wax powder, etc, these are only optional (note column 4, lines 9-11 and claim 1. The only additional requirement for the catalyst of Schuetz is a moistening agent which can be water (note claim 1 and columns 21-25), and water would be evaporated during the drying or calcining step. Furthermore, Schuetz discloses that the fixed bed catalyst consists of powder particles of the catalyst alloy which are bonded by sintering with a powder (i.e. binder) of the Raney process metal itself. It contains no catalytically inactive binder at all" (note column 5, lines 21-25).

Applicants argue that Lepper does not disclose a catalyst consisting of nickel aluminum alloy with Mo and/or Sn.

Lepper is not applied to teach such limitation. Lepper is relied upon to show suitable particle size of catalyst used in a fixed bed.

Other rejections over Schuetz in view of secondary references are maintained for the same reasons stated above.

Applicants argue that Diffenbach '732 does not disclose the presence of Mo and/or Sn.

For claim 5, the range of "up to 15%" would include zero. In any event, Schuetz is applied to teach the desire to add a metal dopant to the Raney catalyst as stated above.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication should be directed to Ngoc-Yen Nguyen at telephone number (703) 308-2536.

The fax phone number for this Group is (703) 305-3599 (for OFFICIAL faxes). UNOFFICIAL fax can be sent to (703) 305-6078.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.

N. M. Nguyen
June 8, 2000

N. M. Nguyen
Primary Examiner
Art Unit 1754